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PIC/JR-8/61

August 1961

JOINT PHOTOGRAPHIC INTELLIGENCE REPORT

TYURA TAM MISSILE TEST CENTER, USSR

A COMPARISON OF [REDACTED]

25X1D

25X1D

AND [REDACTED] PHOTOGRAPHY



ARMY



NAVY



CIA

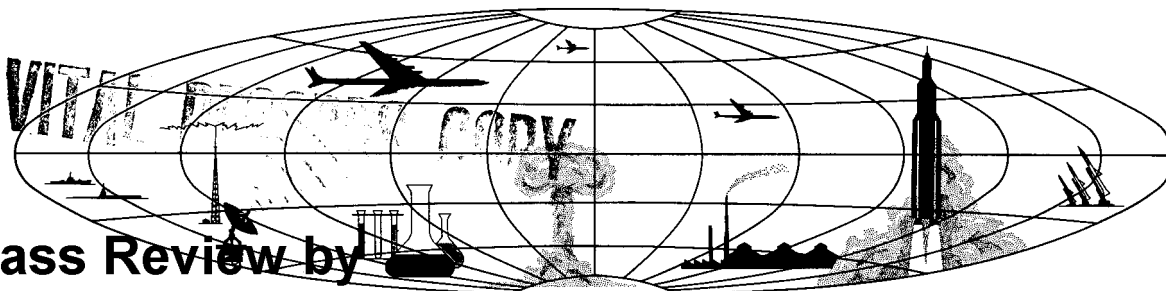
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JOINT PHOTOGRAPHIC INTELLIGENCE REPORT

TYURA TAM MISSILE TEST CENTER, USSR

A COMPARISON OF [REDACTED] AND [REDACTED] PHOTOGRAPHY

25X1D

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PREFACE

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This joint photographic intelligence report, prepared by the Army, Navy, and Central Intelligence Agency, uses [REDACTED] KEYHOLE photography (Mission [REDACTED] to update previous analyses of the Tyura Tam Missile Test Center. As with previous PIC joint reports on this center 1/-4/, this report is confined primarily to the analysis of new developments.

While the KEYHOLE photography provides the most extensive coverage of the Missile Test Center to date, the small scale and lack of image definition necessarily limit detailed analysis. Accordingly, most of the mensural data included are only approximate. All mile distances given are in nautical miles, and all directions are referenced from true North. Also, it should be noted that, for convenience, the present tense has been used to describe the status of facilities as of [REDACTED]

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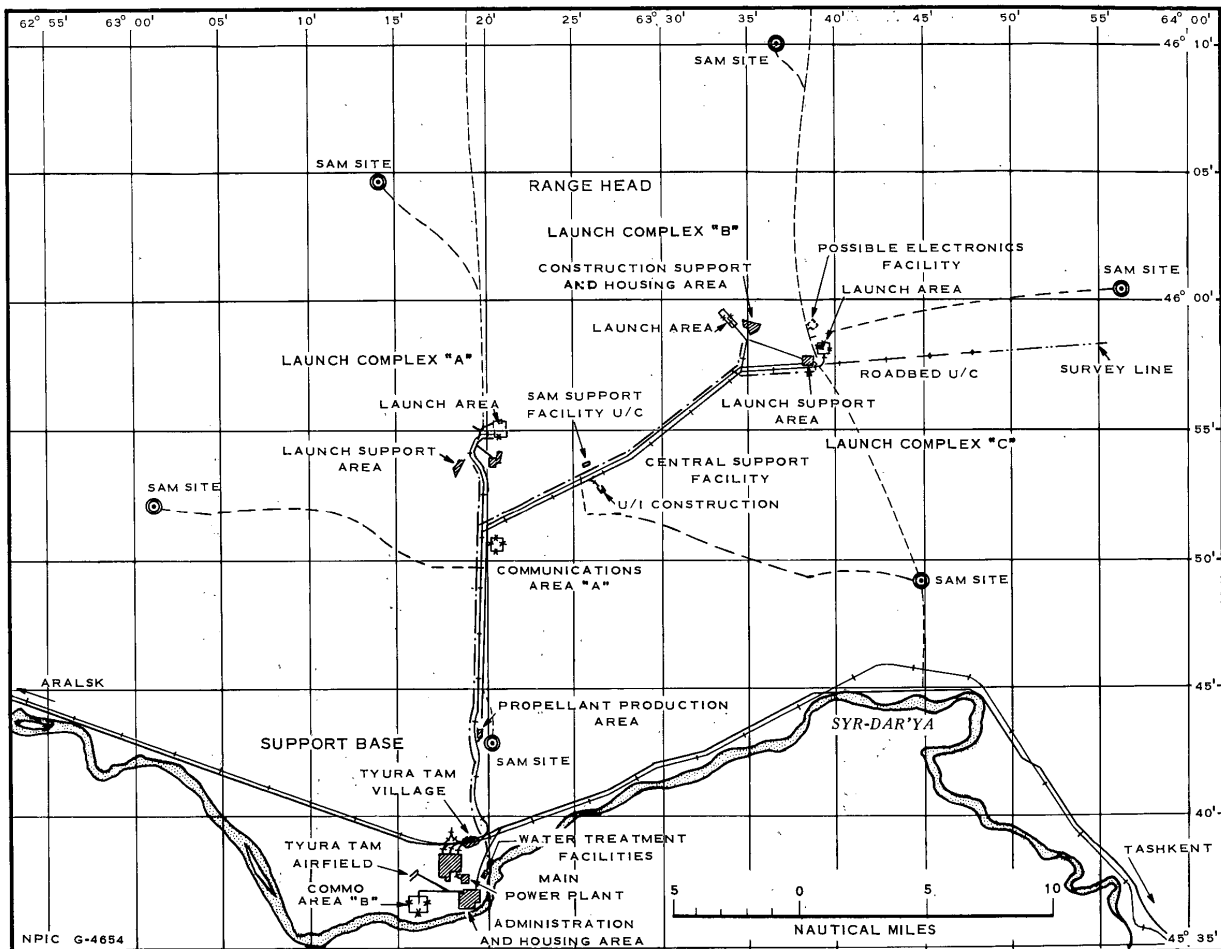


FIGURE 1. TYURA TAM MISSILE TEST CENTER. Features newly identified on Mission are shown in green.

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SUMMARY

25X1D The [REDACTED] KEYHOLE photography of the Tyura Tam Missile Test Center shows that expansion of the Center is continuing. The Test Center now contains a total of five launch sites for ICBMs or space vehicles, located at three launch complexes. Two Launch Complexes, "A" and "B", are primarily research and development areas. The third, Launch Complex "C", was designed as a prototype operational ICBM launch site, with a capability for training troops as well as testing deployment concepts and ground support equipment. 25X1D

25X1D Mission [REDACTED] provides the first cloud-free photography of the Missile Test Center since the TALENT coverage of [REDACTED]. During the [REDACTED] 25X1D month period between the [REDACTED] missions a number of significant developments have occurred throughout the Range Head; only a small portion of 25X1D the new developments were observed on [REDACTED] TALENT photography. 25X1D

25X1D At Launch Complex "A" -- which had not been observed since [REDACTED] 25X1D [REDACTED] -- a new launch site has been identified. This site, designated Launch Site 2-A, is relatively simple in construction. It was built between [REDACTED] 25X1D [REDACTED] and the end of [REDACTED] and may have been designed to test some of the 25X1D concepts which will be further developed at Launch Complex "C" before being utilized at deployed sites.

25X1D Launch Complex "B", now probably operational, shows few additions since the [REDACTED] photography. The launch area, as anticipated, shows many similarities to the original launch site at Launch Complex "A", although no counterpart exists here for Launch Site 2-A. Continuing construction activity at Launch Complex "B" suggests that an expansion program may be under way.

25X1D The construction of Launch Complex "C", first glimpsed through a hole in the clouds on the [REDACTED] photography, has proceeded as anticipated in CIA/PIC/JR-17/60. 3/ The launch area, now about 95 percent complete, contains two road-served "soft" launch pads. The support area contains a rail-served assembly and checkout facility.

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25X1D Since the [REDACTED] photography, the Soviets have begun to provide the Range Head with a surface-to-air missile (SAM) defense system. A ring of six SA-2 SAM sites is under construction around the Range Head, and a SAM Support Facility is under construction near the center of the Range Head.

A new roadbed, constructed since [REDACTED] is being built to the east of Launch Complex "C". It now extends a distance of 6.5 miles, and a faint track, possibly a survey line, continues eastward 5 more miles from the end of the roadbed construction. This new roadbed may indicate the initiation of new launch site construction.

The area midway between Launch Complexes "A" and "B", formerly designated "Construction Support Area," has been redesignated "Central Support Facility". A new unidentified construction project is under way in this area. Although its purpose cannot be determined at the present stage of construction, it is probable that it will be of a sensitive nature. Its location and relationship to surrounding facilities, however, indicate that it is probably not a launch area under construction.

Few changes have been noted in the Test Center Support Base, although a few facilities, which were not visible because of the photographic "holiday" on the [REDACTED] photography, have now been identified.

25X1D Figure 1 shows the general layout and facilities in the Test Center as of [REDACTED]

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INTRODUCTION

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KEYHOLE Mission [REDACTED] provides the fifth, and in many respects the most productive, photographic coverage of Tyura Tam. While the small scale and lack of image definition leave much to be desired in the detailed interpretation of facilities, the broad extent of coverage of the Missile Test Center, combined with the previous photography, provides many indicators of Soviet development practices in ICBM and space programs.

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This report not only discusses new construction at Tyura Tam but also provides an analysis of the Soviet ICBM development program over the [REDACTED] Examination of comparative photography of the Missile Test Center has made it possible to draw a number of conclusions relating to the ICBM construction program at Tyura Tam, and, as a corollary, to the probable ICBM deployment program.

This report is concerned primarily with new developments at the Missile Test Center. Its organization generally follows that of the preceding PIC reports, although several changes in area designation have necessitated some reorganization. Where no changes are noted from information given in one or more of the previous reports, there is no repetition of data, and discussion is accordingly being confined to those items newly identified on photography.

RANGE HEAD

Facilities discussed under this heading of this report include Launch Complexes "A", "B", and "C", with their associated launch support areas, and the newly constructed SAM defense system. The Central Support Facility, included in the Range Head discussion in PIC/JR-2/60 2/, is now described in detail under "Support Base." Figure 2 shows the Range

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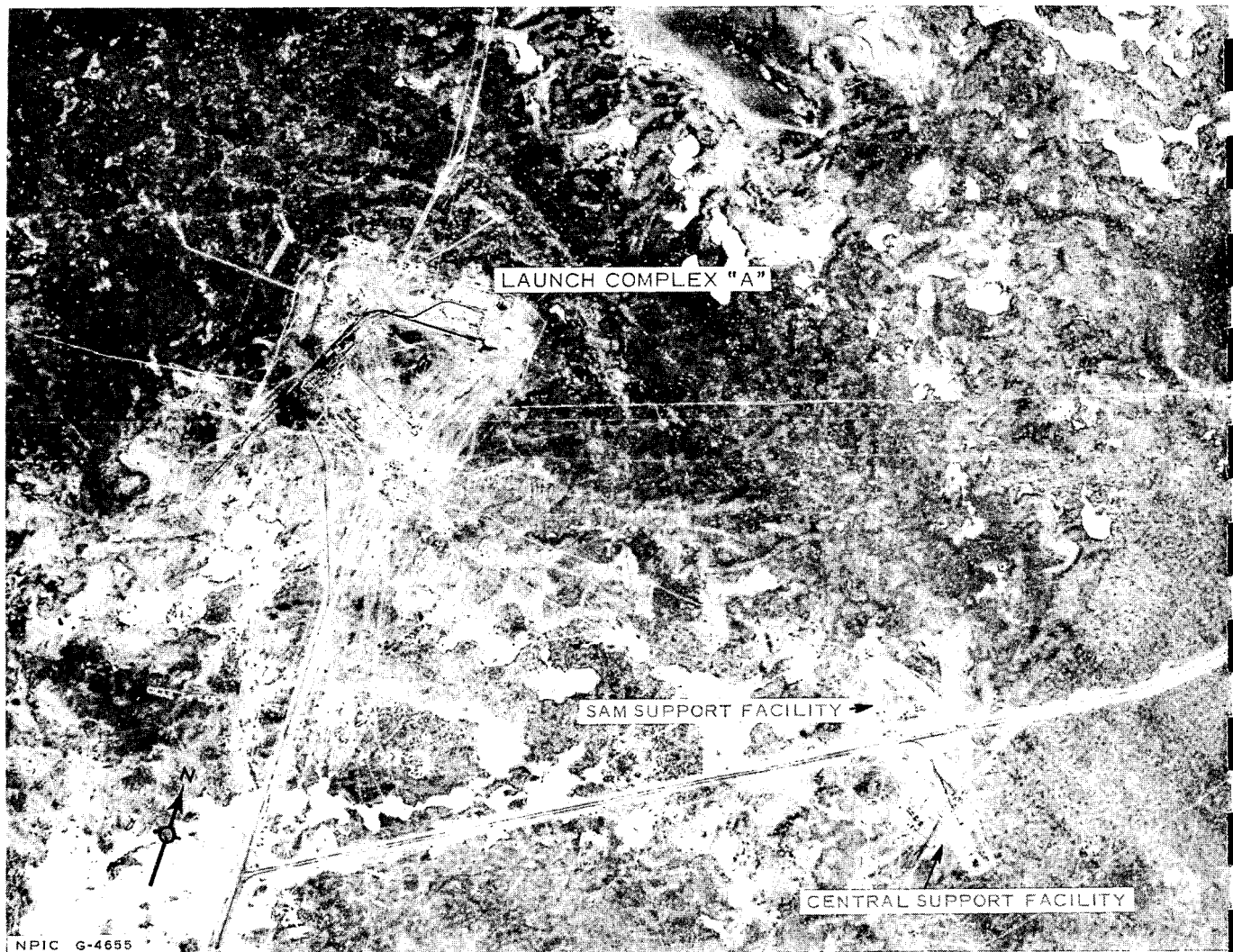


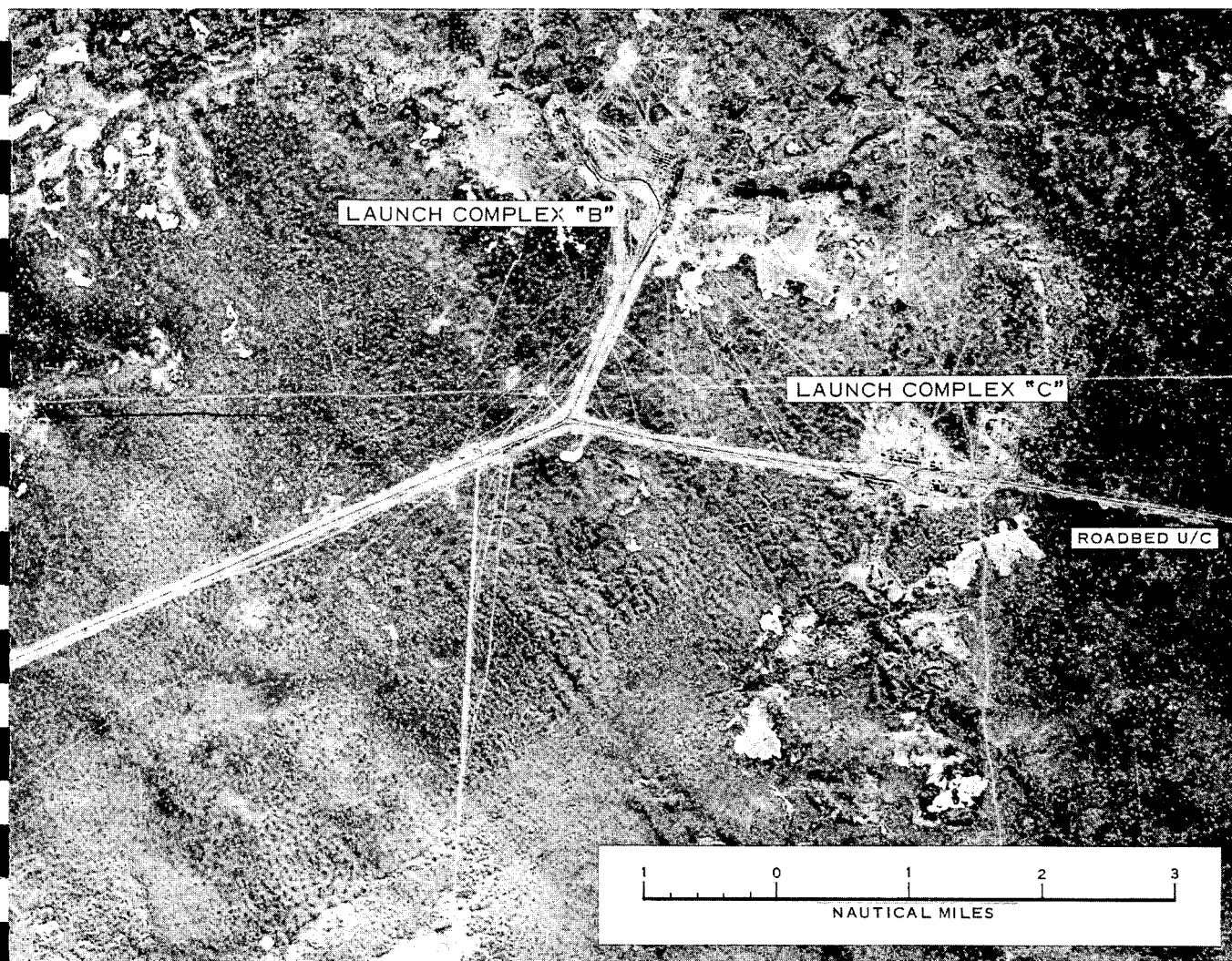
FIGURE 2. RANGE HEAD, TYURA TAM MISSILE TEST CENTER. This photograph of the Range Head,

Head facilities, as well as the Central Support Facility, as they appear on the [REDACTED] photography.

LAUNCH COMPLEX "A"

Mission [REDACTED] provides the first complete photographic coverage of Launch Complex "A" since [REDACTED]. The most significant change since

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combined with the previous photography, provides many indicators of the Soviet ICBM and space programs.

that time is the addition of a new launch site north of the original launch site. Several new buildings, probably associated with the new launch site, have also been added. To facilitate identification, the original launch site has been redesignated Launch Site 1-A, while the new launch site is designated Launch Site 2-A. The line drawing, Figure 3, includes only those portions of Launch Complex "A" in which changes have taken place since

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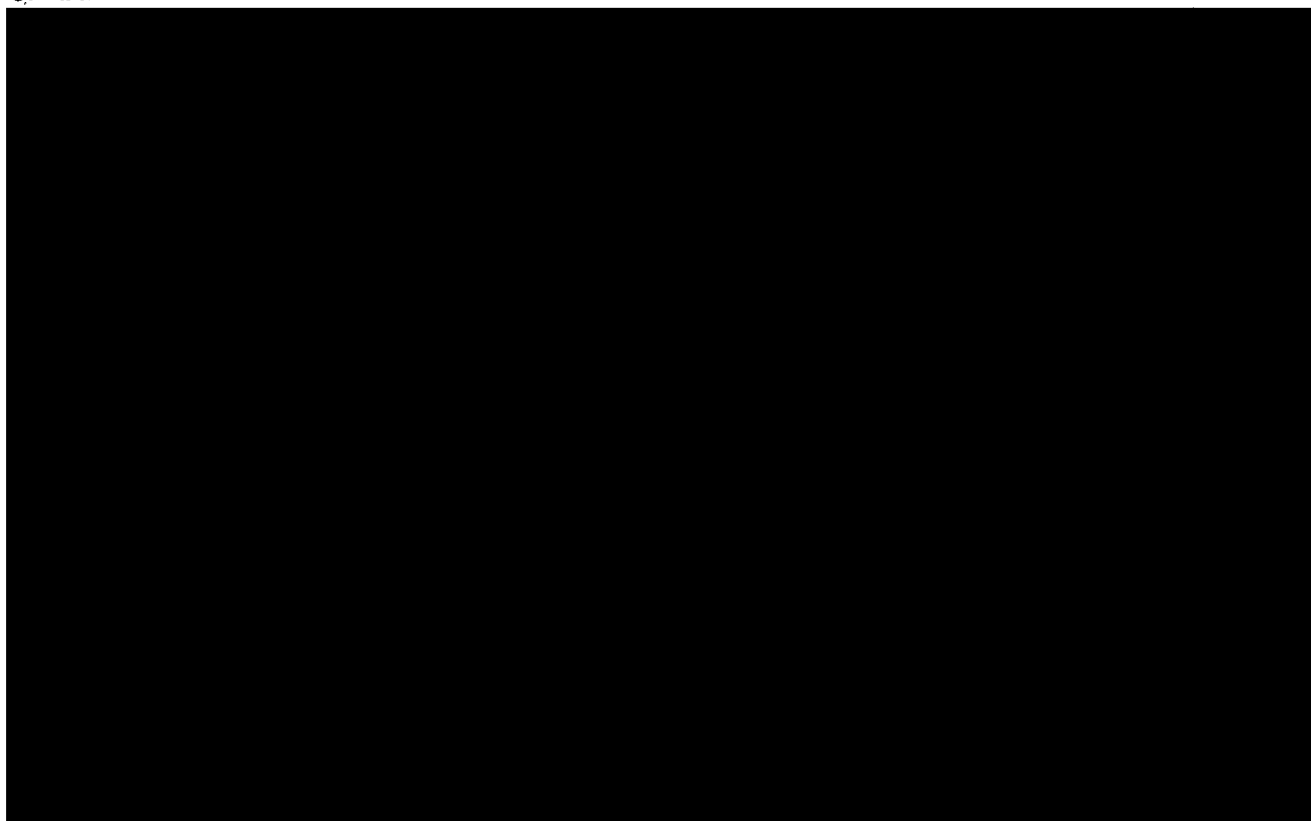
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Launch Area

The double fence, which originally enclosed an area 2,925 by 1,620 feet, has been extended 1,300 feet north to include an additional area of about 87 acres. The area now enclosed by a security fence has approximately doubled.

Launch Site 1-A. Few discernible changes have been made at this launch site. The launching structure is probably unchanged, and, while details are indistinct, no changes are evident in the rail embankment which abuts the launching structure. Several rail cars are discernible on the

25X9 embankment.



Launch Site 2-A. This site consists of a road-served octagonal concrete launch pad, an adjoining rail spur, and at least one associated probable building. The site is reached by a new service road and rail line built from the existing rail and road network. The road and the rail line

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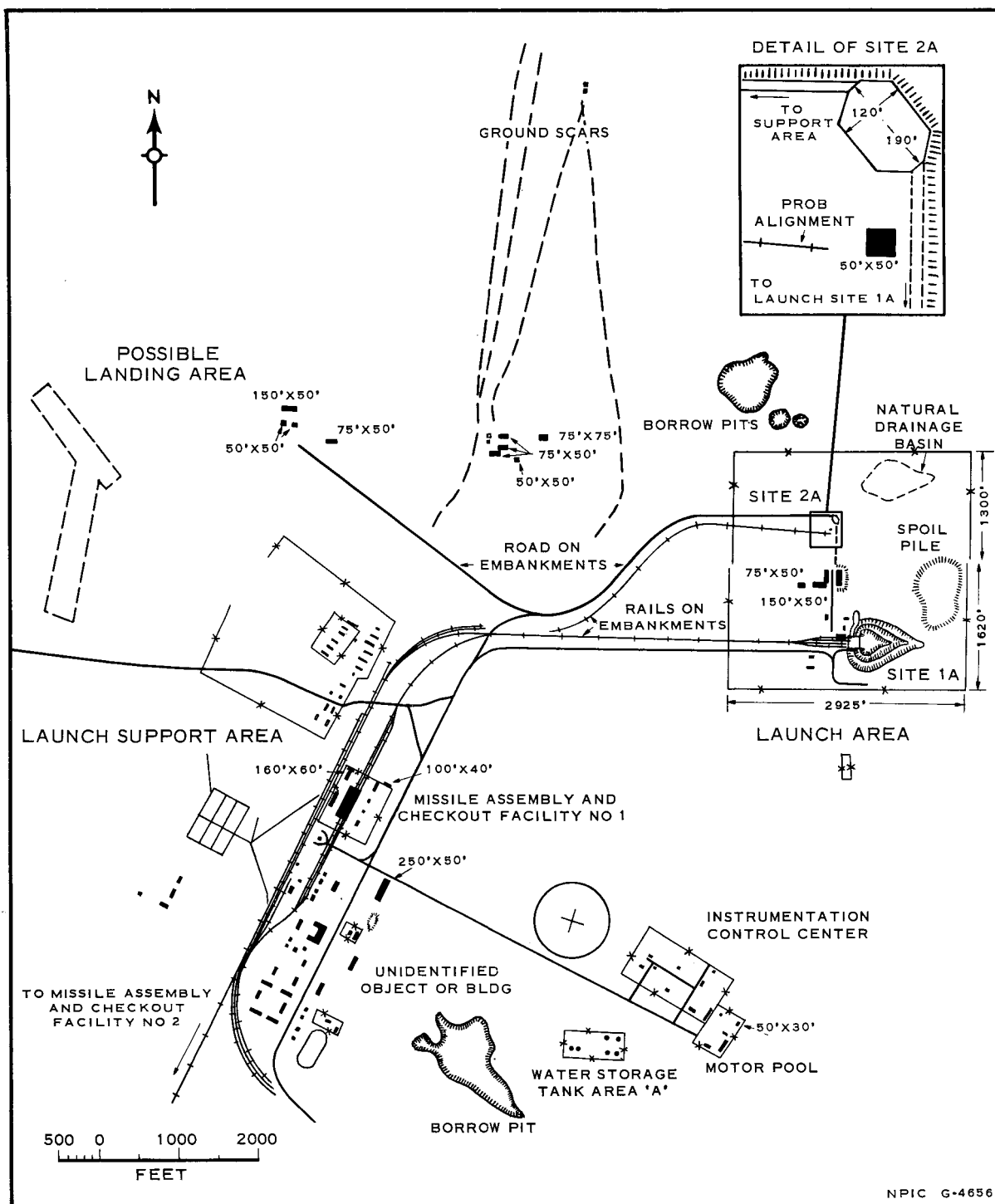


FIGURE 3. LAUNCH COMPLEX "A". The most significant change at this complex since [REDACTED] is the addition of a second launch site.

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which are on separate parallel embankments, curve to the northeast and then to the east before entering the fenced area. From this point the new road extends due east, directly to the pad, while the rail line angles to the east-southeast, terminating at a probable building 50 feet square south of the pad. From the fence line west the road and rail line share a common embankment. This embankment is fan-shaped and is about 1,000 feet long and 350 feet wide at the east end. The rail spur on the embankment may have several dead-end sidings comparable with those at Launch Site 1-A. However, no rail spurs or sidings appear to abut the launch pad itself.

The launch pad, shown in the inset on Figure 3, measures about 190 by 120 feet. Its long axis is oriented northwest-southeast. The road serving the pad approaches from the west and abuts the northwest end of the pad. A second road may extend due south from the southeast end of the pad to join the embanked road which leads to the rail embankment at Launch Site 1-A.

While most of the facilities within Launch Site 2-A appear to represent a departure from the concepts developed at Launch Site 1-A, the relationship between the two sites suggests that they may share a number of common facilities. Although the pad at Launch Site 2-A lies about 200 feet west of a line projected between the launching structure at Launch Site 1-A and the control bunker, the two launch sites are equidistant from the bunker, about 650 feet in each instance. Furthermore, the road which connects the rail embankment at Launch Site 1-A with the "Hi-Hat" building and the two new buildings in its vicinity may be used to support operations at both launch sites.

The relative simplicity of Launch Site 2-A, compared with Launch Site 1-A, appears to represent a radical change of concept. However, a number of similarities to facilities at Launch Complex "C" are readily apparent. These similarities will be discussed in detail in that portion of this report.

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Launch Support Area

Relatively few changes have been made in the Launch Support Area, and most of these are apparently linked to the construction of Launch Site 2-A.

A possible landing area for light liaison-type aircraft has been added 4,000 feet northwest of Missile Assembly and Checkout Facility No 1. The area consists of two graded-earth strips, one 2,000 by 300 feet and oriented on an azimuth of [REDACTED] and the other about 1,400 by 200 feet, oriented on an azimuth of [REDACTED]. If this area is a landing area, the length of the runways is adequate for use by light aircraft, but it is unusual to find two intersecting runways at a field which apparently has not been designed to accommodate aircraft larger than single-engine liaison types.

Two low shop-type buildings have been added within the fence line enclosing Missile Assembly and Checkout Facility No 1. One is 160 by 60 feet and the other is 100 by 40 feet. A third building, the largest new building at Launch Support Area "A", measures 250 by 50 feet and may be several stories high. It is east of the power substation, near the junction of the road leading to the instrumentation control center and the main road which passes through the Launch Support Area and serves the launch sites. An unidentified object, possibly a building, is just southwest of the power substation.

Two groups of buildings, probably associated with Launch Site 2-A, are north of Missile Assembly and Checkout Facility No 1, about 4,000 feet west of Launch Site 2-A. The group farthest to the west contains four buildings, one 150 by 50 feet, two 50 feet square, and one 75 by 50 feet. The road which provides access to this group of buildings is well defined; its orientation suggests that the main traffic flow from this group of buildings is toward Launch Site 2-A. The function of these four buildings has not been determined.

A second group, containing seven buildings, is about 1,000 feet farther east. Six of the buildings, varying in size from 50 feet square to 75

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by 50 feet, are clustered, while the seventh, about 75 feet square, is at the apex of a clearing which looks like a segment of a circle. The building is unlike any of the other new structures in that it may be as much as 75 feet high. This group of seven buildings may have some instrumentation function. A new trail leading north from the area ends at a cleared site containing two small structures. This site resembles several of the older Range Head instrumentation sites and may have been added to augment or replace one or more of them.

LAUNCH COMPLEX "B"

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Launch Complex "B" was last seen in its entirety on the [REDACTED] photography. During the [REDACTED] month interval between then and the [REDACTED] coverage, relatively few additions have been made to the Complex. Construction within the Launch Area has proceeded approximately as anticipated in PIC/JR-2/60. 2/ The Launch Area now contains a single rail-served launch structure, similar to that at Launch Site 1-A, and a rail-served assembly and checkout building. Construction has continued at the Construction Support and Housing Area, with few changes noted since those observed on the photography of [REDACTED] and reported in PIC/JR-17/60. 3/ Figure 4 shows the new features identified in the Complex since the last readable photography. Features shown in green within the Launch Area reflect changes made since [REDACTED] while features shown in green within the Construction Support Area consist solely of those items added since [REDACTED]

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Launch Area

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Few unexpected changes in the Launch Area have been made since [REDACTED] The launching structure and its associated features are now complete, and bear a marked resemblance to their counterparts at Launch

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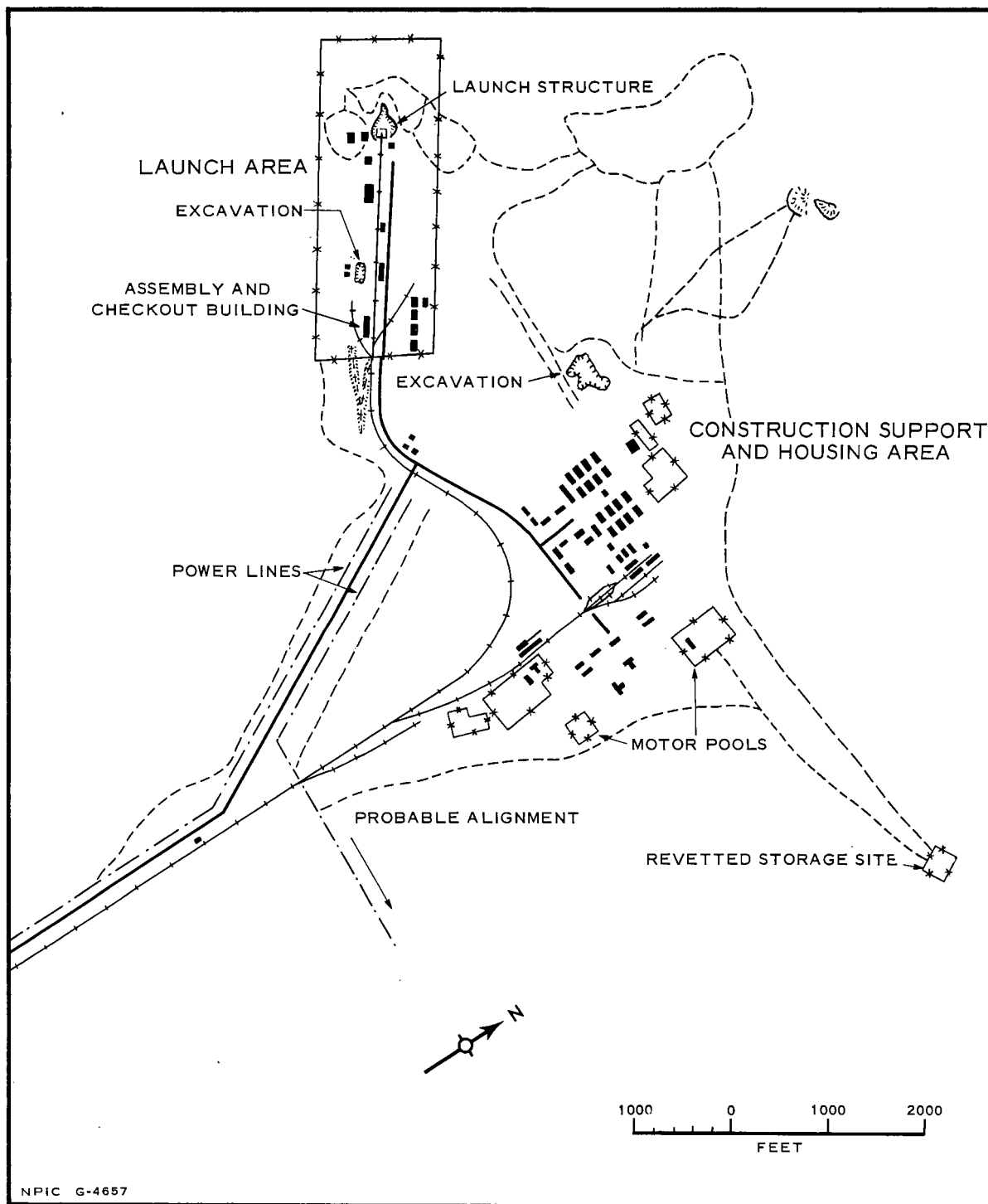


FIGURE 4. LAUNCH COMPLEX "B". The launch area is now essentially complete, while minor construction activity continues throughout the complex.

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Site 1-A. The launching platform is rail-served, and has approximately the size and shape of the 135-foot-square launching platform at Launch Site 1-A. The shadow of a servicing tower similar to that at Launch Site 1-A is clearly visible, falling against the side of the pit. The quality of the photography precludes measurement of either the platform or the tower.

The pit itself is appreciably smaller than its counterpart at Launch Complex "A". It is only about 400 by 300 feet, against 880 by 550 feet for the pit at Complex "A". This difference is due in part to the gradient of the terrain around the launching structure, which necessitated less excavation than was required at Launch Complex "A". Also, the pit at Launch Complex "A" may have been larger than necessary, and experience gained in the construction of Complex "A" may have resulted in construction of a smaller facility at Launch Complex "B".

The excavation for the control bunker which appeared on [REDACTED] photography of the Launch Area has been largely filled in, although the appearance of shadows on the KEYHOLE photography suggests that, while the control bunker has probably been constructed in the excavation, the surrounding terrain has not been filled up to grade level, as was done at Launch Complex "A".

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25X1D The rail-served assembly and checkout building which was under construction in [REDACTED] is now complete. It measures approximately 285 by 70 feet and 75 feet high, with a shop section 285 by 30 feet along the south-west side (measurements from [REDACTED] TALENT photography). The rail line now passes through the building and continues in a straight line to the launching structure. A service road parallels the rail and is traceable to a point some 400 feet east of the launching structure. The large circular tanklike structure which appeared on the [REDACTED] photography some 250 feet southeast of the launching structure is no longer visible, and has probably been buried beneath the rail embankment serving the launching structure. The rail spur which branched to the west from a point southeast of the building on the [REDACTED] photography is still present and may serve as a stor-

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age spur, since it does not appear to serve any visible structure. A possible second rail spur, added since [REDACTED] leaves the main line about 100 feet southeast of the building and extends about 500 feet to the north-northwest. Near the terminus of this spur are five new buildings, possibly for housing. 25X1D

At least four other new buildings have been erected within the launch area. Three of these are adjacent to the rail line, and the fourth is about 300 feet southwest of the control bunker. Its position, compared with the arrangement of buildings at Launch Site 1-A, suggests that it may be a counterpart for the "Hi-Hat" building at Launch Complex "A". Construction details are not distinct enough to confirm this possibility.

Several features within the Launch Area suggest that, while the area is operational, construction is not yet complete. A large rectangular excavation, almost 300 feet square, has been dug on the northwest side of the rail line about 350 feet west-northwest of the assembly and check-out building. The purpose of the excavation is unknown, but its shape and location suggest that it may represent the beginning of construction of a large new building. Two small buildings, possibly associated with the excavation, have been erected on the southwest side of the excavation. Several other excavations, scarred areas, and construction-type roads within the launch area also suggest that additional construction is under way.

The Y-shaped earth embankment outside the southeast end of the fence line enclosing the launch area remains apparently unchanged. It cannot be determined whether a rail track has been laid on the embankment; if so, however, no rail is visible beyond the end of the embankment. Accordingly, its function remains unknown.

Construction Support and Housing Area

Few visible changes are evident in the Construction Support and Housing Area since the [REDACTED] photography. The area appears active, 25X1D

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however, and no construction support equipment appears to have been removed.

A new fenced area, resembling the fenced storage areas north and east of the Construction Support and Housing Area, has been added south of the largest storage area east of the rail line. At least one, and possibly two, buildings are evident in the area.

A rail spur almost 1,500 feet long has been identified south of the original spur line serving the Construction Support and Housing Area. Although it was not previously reported, re-examination of the [REDACTED] photography reveals that the spur, although barely visible through the cloud cover, was present and probably complete at the time of that photography.

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A cluster of at least three buildings, constructed since the [REDACTED] photography, is located on the north side of the road connecting the Construction Support and Housing Area with the Launch Area, opposite the point where the mounded water line, a road, and two power lines probably intersect the road and rail line serving the Launch Area. Their location midway between the Launch Area and the Construction Support and Housing Area suggest that they may serve as a water pumping station and/or a power substation.

A further indicator of continuing construction activity at Launch Complex "B" is the presence of four additional borrow pits about 1,000 feet northwest of the Construction Support and Housing Area.

LAUNCH COMPLEX "C"

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Launch Complex "C", in the early stages of construction in [REDACTED] is now nearly complete. Although a number of features now found within the complex were not visible in [REDACTED] because of the extensive cloud cover over the entire Test Center, most of the facilities now present were probably either present or under construction in [REDACTED] as evidenced

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by the uniformity of construction scarring throughout the area.

The Complex contains two major components: (1) a double-fenced Launch Area containing two "soft" road-served launch pads, and (2) a Launch Support Area containing an Assembly and Checkout Facility, a Possible Warhead Handling Facility, and an Administration and Housing Area. A third component, a Possible Electronics Facility, has been added since [REDACTED] (see Figure 5).

A significant new development in the vicinity of Launch Complex "C", but probably not directly associated with it, is the construction of a new roadbed extending east-northeast of the Launch Area. At the time of the [REDACTED] photography, only about 250 feet of the roadbed had been constructed. By [REDACTED] however, the bed had been extended nearly 6.5 miles to the east-northeast. A faint straight-line vehicle track continues beyond the end of the roadbed for approximately 5 more miles.

The roadbed has been extended in a straight line which coincides with an extension of the main service road, within Launch Complex "C". The construction technique involved, however, is typical of railroad construction evidenced elsewhere at Tyura Tam. Careful attention has been given to alignment, and the gradient has been kept uniform by extensive fill where required, as evidenced by numerous scars appearing on both sides of the roadbed.

It is possible that a railroad crossover, not visible on photography, has been or will be constructed within Launch Complex "C", and that the roadbed construction may represent a new rail line rather than a road.

The construction of the new roadbed provides a strong indication that further expansion of the Tyura Tam Missile Test Center is under way and that the construction of additional launch sites is contemplated.

Figure 5 shows the Launch Complex as it appears on the [REDACTED] photography. Shown in green are those items known to have been added since [REDACTED]. Features appearing in the shaded portions of the drawing were not visible in [REDACTED] but were probably present or under construction and are therefore shown in black.

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Launch Area

The Launch Area is nearly complete, with a few facilities still under construction. The most prominent feature apparent within the Launch Area is the road net, which forms a heart-shaped loop passing through the two launch sites and paralleling the north side of the fence just south of a drive-through building. Three secondary loop roads provide additional access to facilities within the loop. At at least four of the intersections formed by these secondary roads, wide, sweeping turns provide easy access for vehicles traveling in either direction. A single-track rail line, present in [REDACTED] passes just east of the road which bisects the heart-shaped loop.

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A detailed description of facilities within the Launch Area follows (item numbers are keyed to Figure 5).

1 and 2 -- Launch Sites 1-C and 2-C. The two launch sites are now apparently complete and are nearly identical. Each launch pad is octagonal, and measures approximately 180 by 120 feet, with the long axis oriented generally north-south. The loop road passes along the outside of each pad. The vehicle stalls, under construction in [REDACTED] cannot be clearly distinguished from the launch pads themselves, but appear to have been roofed at the same level as the surface of the pads, providing a uniform surface. Two major differences between the two launch sites are evident. First, Launch Site 1-C appears uniformly darker in tone than Site 2-C, suggesting that the two sites are in a different stage of final construction. Second, the secondary service roads which probably provide access to the vehicle stalls for each launch site are aligned differently. Although each road intersects the upper portion of the primary loop service road at about the same relative distance from the launch site it serves, the road serving Launch Site 1-C returns to the loop road after passing the vehicle stalls, whereas the road serving Launch Site 2-C turns to the west after passing the service stalls, then passes just north of the two buried tanks, and intersects the central secondary road. This differ-

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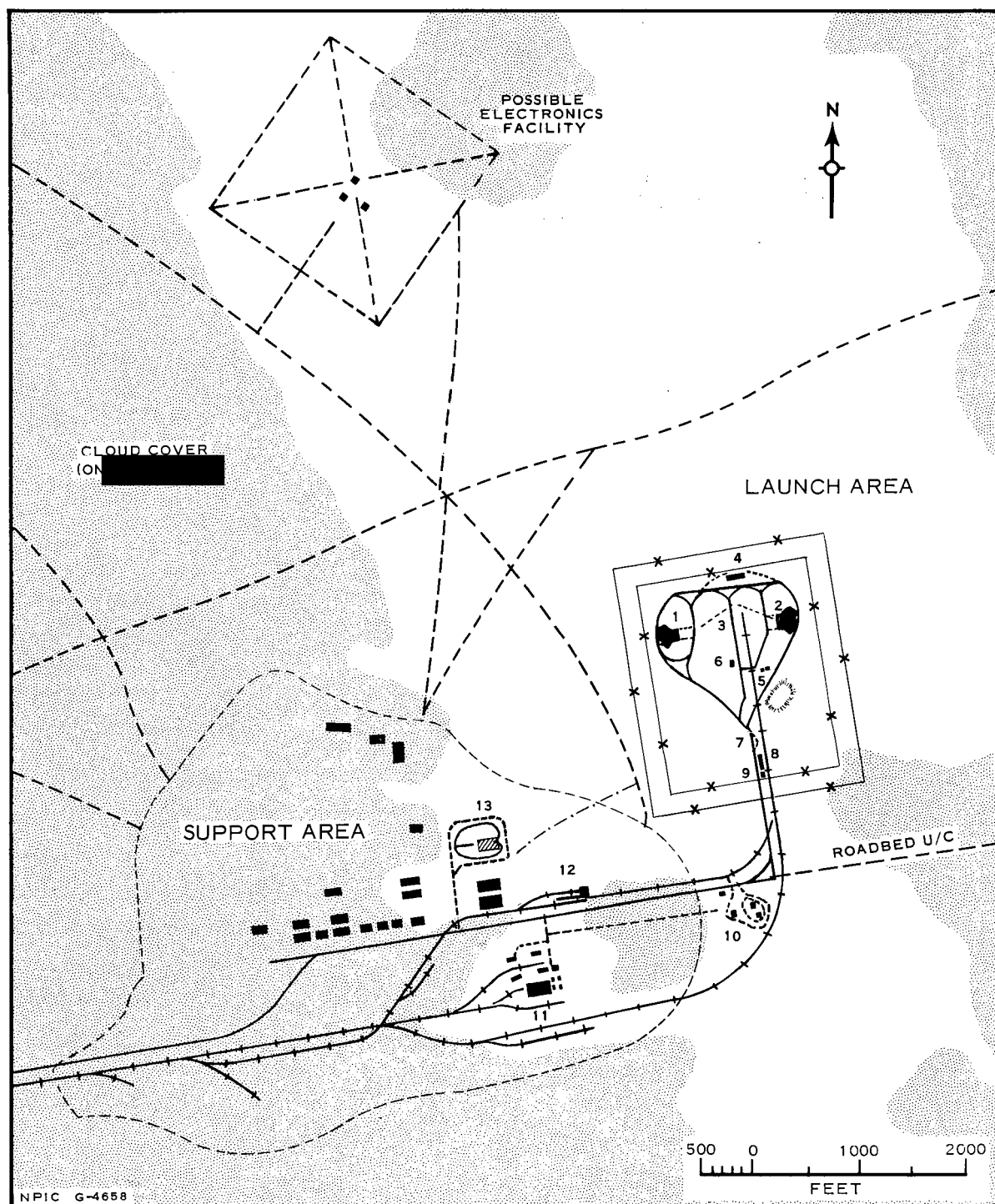


FIGURE 5. LAUNCH COMPLEX "C". Analysis of this complex as a prototype operational ICBM site provides a number of indicators which should be helpful in identifying deployed ICBM sites.

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ence in road alignment may have been dictated by terrain irregularities, although it is more likely that road construction was kept to a minimum while still providing access to all facilities within the launch area.

25X1D 3 -- Control Bunker. This bunker, which measured 60 by 45 feet on the [REDACTED] photography, has now been buried. Its top appears to be nearly flush with the surrounding terrain, and its outlines are no longer distinct. The cable ditches shown on the [REDACTED] photography connecting the control bunker to the launch sites have now been filled in.

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25X1D 4 -- Possible Missile Ready Building. This building, 160 by 45 feet, under construction in [REDACTED] now appears complete. Although the building is north of the main loop service road, a second road, faintly visible, passes through the building and intersects the main road north of each launch site. The building appears to be of ample size to hold at least one missile; the width of the road passing through it suggests that only one missile would be handled in the building at any time. The building could perform one or more of several functions: it could be used for minor recycling of a missile which had previously been on a launch pad; or, if a rapid refire capability were desired, two missiles could be emplaced at the launch sites while a third missile was stored in the building.

25X1D 5 -- Two Semiburied Tanks. It was concluded in PIC/JR-17/60 3/ that these tanks, each [REDACTED] in diameter, were to be used for water storage. It is also possible that these tanks may be used for fuel storage. Their proximity to the rail line suggests that fuel could be easily transferred from rail tank cars to the tanks.

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25X1D 6 -- Unidentified Structure. This structure, approximately 60 by 45 feet, has been built in an area which had been graded on the [REDACTED] photography. It is possible that the four cylindrical tanks, each measuring [REDACTED] in diameter, and lying at random along the rail track in April, have been installed in a bank at this point. Their central location within the Launch Area and their proximity to the circular semiburied tanks suggests that they may be LOX tanks and that a similar transfer method may be employed for both fuel and oxidizer.

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25X1D 7 -- Paved Hardstand. This hardstand, 95 by 20 feet (measurement from [REDACTED] TALENT photography), was graded, although not paved, in [REDACTED] Although contiguous to the main service road, it does not appear to provide access to the rail line. It may serve as a temporary parking apron for service vehicles.

25X1D 8 -- Building. This building is 95 by 35 feet (measurement from [REDACTED] TALENT photography). Its function cannot be determined. Although located within the Launch Area, it does not appear suitable for an operational support function. It may house personnel, although there appear to be ample facilities for this purpose within the Support Area.

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25X1D 9 -- Building. This building is [REDACTED] (measurement from [REDACTED] TALENT photography). Its location suggests a security function.

Support Area

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25X1D Although most of the facilities within the Support Area were not visible in [REDACTED] because of cloud cover, most of them probably were either present or under construction at that time. The cloud-free [REDACTED] photography reveals an extensive rail net throughout the Support Area, with at least six dead-end sidings, two of which were not yet constructed in [REDACTED] providing on-rail storage space throughout the Support Area. The rail net bears little resemblance to that found at the other launch complexes at the Test Center, although a short spur (which has since been removed) similar to several spurs at Complex "C" was visible on [REDACTED] photography of Launch Complex "B".

25X1D Facilities within the Support Area appear to be divided into three major areas: an Assembly and Checkout Facility, containing a rail-served industrial-type building and several associated outbuildings; a Possible Warhead Handling Facility, containing a drive-through building under construction; and an Administrative and Housing Facility, contain-

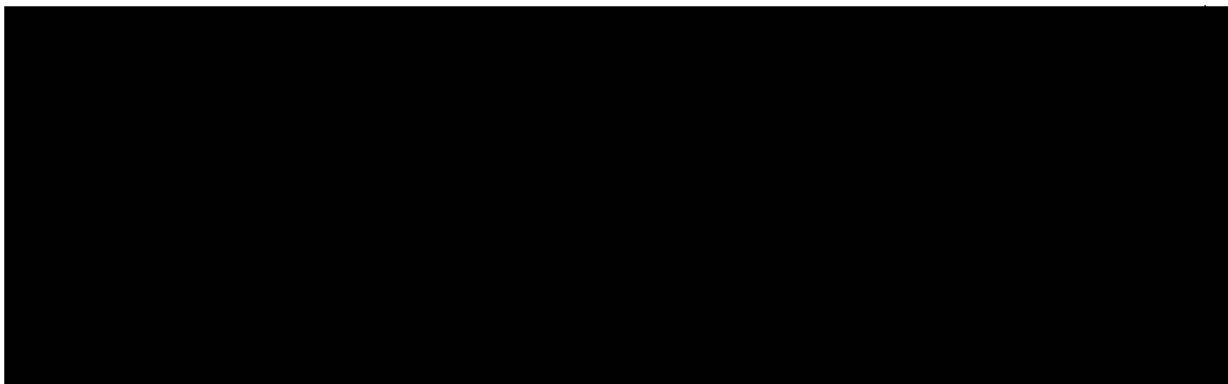
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ing about 13 buildings. Several other groups of buildings and miscellaneous structures are located throughout the Support Area. A detailed description of items within the Support Area follows (item numbers are keyed to Figure 5).

25X1B



11 -- Assembly and Checkout Facility. This facility, at the end of the main access rail entering the Launch Complex, contains a total of six buildings, two of which have been constructed since [REDACTED]. The most significant of the six buildings is the Assembly and Checkout Building itself, a monitor-roofed, rail-served structure measuring [REDACTED].

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In [REDACTED] the building was not yet served by rail. The [REDACTED] photography reveals that at least one, and possibly two, rail lines enter the building from the west end, at points corresponding to the doors which were visible on the [REDACTED] photography. No rail lines are visible on

25X1D

the east end of the building, but heavy track activity leading north from the east end suggests that road construction is under way, connecting the east end of the building with the east-west road which serves the Launch Area. It is probable that missiles and/or component parts arrive at this building by rail, final assembly and checkout operations are performed on the missile, and the missile is then transferred to a road transporter within the building for transportation to the Launch Area.

The remaining five buildings within the Assembly and Checkout Facility are aligned in two rows parallel to the long axis of the Assembly and Checkout Building and vary in size from 85 by 30 feet to 35 by 25 feet. They may serve as laboratory and/or shop-type buildings. A rail spur,

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25X1D new since the [REDACTED] photography, passes between the two rows of buildings.

25X1D The road net within the Assembly and Checkout Facility is indistinct. The extensive scarring suggests that the road net is not yet complete. A probable fence, visible on the [REDACTED] photography, cannot be discerned on the [REDACTED] photography, but it is probable that the area is secured.

25X1D 12 -- Transloading Facility. A rail-to-road transloading facility, which was visible but not identified on the [REDACTED] photography, has been constructed north of the Assembly and Checkout Facility, immediately adjacent to the road and rail lines connecting the Support Area and the Launch Area. The facility consists of an L-shaped loading dock which lies between a through rail spur leading to the Launch Area and a dead-end spur which terminates at the L-shaped projection of the loading dock. 25X1D The dock measured [REDACTED] photography, with a projection [REDACTED] feet on the north side of the east end, providing an overall width at that end of about 45 feet. The east end slopes down gradually, and a road, added since [REDACTED] provides a connection between this end and the main access road to the Launch Area. The dock appears suitable for the transfer of wheeled vehicles from flatcars to a road, and may have been constructed to handle vehicles used to support ground servicing equipment. 25X1D

25X1D 13 -- Possible Warhead Handling Facility. This area contains a single drive-through building, under construction, measuring 130 by 60 feet (measurement from [REDACTED] photography). In [REDACTED] only the footings for the building were in place, and no road net was discernible. Since that time the walls have been erected, but the roof is not yet in place. A wide rectangular scar resembling a road under construction surrounds the building, and a road trace through the center of the rectangle passes through the long axis of the building. Although no positive identification can be made, both the location and the dimensions of the building suggest that it may serve as a handling area for missile nose-

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cones. Its size is compatible with the dimensions of the majority of the other "Hi-Hat" buildings, and the road net which serves it is similar to those found at the two "Hi-Hat" buildings in Launch Complex "C" at Kapustin Yar. However, there are no structures which can be equated with either the three-bay concrete storage bunker at Launch Complex "A" at Tyura Tam or the revetted storage bunker associated with each of the "Hi-Hat" buildings found at Surface-to-Surface Missile (SSM) Launch Complexes "C" and "G" at Kapustin Yar.

25X1D

Two identical large buildings, both of which were under construction in [REDACTED] are located between the drive-through building and the access road to the Launch Area and may be associated in some way with the Possible Warhead Handling Facility. Their dimensions (based on the [REDACTED] photography) are 160 by 50 feet.

25X1D

The rest of the buildings within the Support Area appear to be associated with administration, service, and housing functions. The majority, a group of at least 13 buildings, are west of the Possible Warhead Handling Facility and vary in size from 160 by 45 feet to about 80 by 50 feet. Four of the buildings were visible on the [REDACTED] photography and resembled barracks.

25X1D

In addition to the group of 13 buildings, at least four structures are farther north, scattered throughout the area in no discernible pattern. The function of these additional buildings cannot be determined.

Possible Electronics Facility

A new facility, probably still under construction, is located one mile north of the Support Area and may serve an undetermined electronics function. It consists of a cluster of three small buildings, each about 20 feet square, positioned in the center of a scarred area approximately 1,850 feet square. At each corner of the square is a small object, possibly a building. Trails connect each of the four corners. Faint tracks

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also connect the diagonally opposite corners of the square. A road or trail enters the area through the middle of the southwest side of the square and extends to the group of buildings in the center; a second trail, an extension of an older trail present in [REDACTED] intersects the southeast side of the square but does not appear to continue into the center.

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The function of this facility cannot be determined from existing photography. It closely resembles Communications Areas "A" and "B" in both size and general appearance of facilities, but it is questionable whether an extensive antenna farm would be found at a single launch site, in view of the excellent communications facilities already apparent at the Test Center. It is equally possible that this area may contain a guidance facility. While it has been generally concluded that the interferometer at Launch Complex "A" -- if it serves a guidance function -- could act as a guidance facility for both Launch Complexes "A" and "B", it is probable that a separate guidance facility would be required for Launch Complex "C", in view of the radically different concept displayed in site configuration.

Functional Analysis

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The examination of Launch Complex "C" as it neared completion on [REDACTED] photography tends to confirm the conclusion, reached in PIC/JR-17/60 3/, that the complex has been designed to serve as a prototype operational ICBM site and as a facility for training troops. The Complex contains none of the elaborate research and development (R&D) facilities evidenced at Launch Complexes "A" and "B", but appears to provide the minimum elements necessary to service and support the missile, while requiring a minimum of construction time.

A comparison between Launch Complex "C" and Launch Site 2-A reveals a significant number of similarities which suggest that Launch Site 2-A may have been constructed as an interim facility to test the concepts to be employed at Launch Complex "C". It is possible that the

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transition from a rail-served launch stand to a rail-to-road concept may have required an interim test facility to develop the ground support equipment required for such an operation. By utilizing existing facilities at Launch Complex "A", the development of road-mobile equipment, as well as the simpler launching facilities, could be effected with a minimum of new construction. An examination of counterpart facilities at Launch Site 2-A and the Launch Area at Complex "C" reveals a number of physical similarities. The launch pads are nearly identical, in both size and configuration, although the road pattern for vehicular traffic is somewhat different. Launch Sites 1-A and 2-A are each about 650 feet from the control bunker; Launch Sites 1-C and 2-C are also each 650 feet from a central control bunker. Although vehicle stalls comparable with those at Launch Complex "C" are not in evidence at Launch Site 2-A, the 50-foot-square probable building adjacent to the pad at that site may serve the same function.

Certain dissimilarities between the two sites are also evident. There appear to be no counterparts at Launch Site 2-A for the possible fuel and oxidizer storage found at Launch Complex "C". However, the transfer of both propellant and oxidizer could be effected from tank cars on the rail spur adjacent to the launch pad at Site 2-A. It should be noted that the photographic quality is not sufficient to provide positive identification of all facilities at Launch Site 2-A, and propellant and/or oxidizer storage may be present. Most of the identifications of facilities at Launch Complex "C" were greatly facilitated by a comparison with larger scale TALENT photography. No comparative photographic cover was available for analysis of facilities at Launch Site 2-A.

A major dissimilarity between the two sites lies in the probable concept of warhead handling. While warhead handling at Launch Complex "A" is probably done at the "Hi-Hat" building within the fenced launch area, the Possible Warhead Handling Area at Launch Complex "C" is located within the Support Area.

Analysis of Launch Complex "C" as a prototype operational ICBM

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site provides a number of indicators of Soviet concepts which will be recognizable at deployed sites. Although the exact number of launch areas within any deployed ICBM complex cannot be determined from examination of facilities at Tyura Tam, it is probable that each launch area will resemble that found at Launch Complex "C" in many respects, and that the support area for the deployed launch complex will contain certain basic facilities evidenced at Tyura Tam. Terrain features may dictate the layout of individual deployed sites. The principal recognizable facility at the support area of a deployed complex will probably be a rail-served assembly and checkout building similar to the [REDACTED] building at Complex "C". A warhead handling facility, probably served only by road, will be in the near vicinity, as will sufficient housing facilities for personnel. Access from the support area to the launch area (or areas) will be by road, although it is possible that service rail lines, for the transportation of fuel and oxidizer, may also be present. While the configuration of the deployed ICBM launch areas may vary from that found at Tyura Tam, it is probable that a number of features will be consistently the same: each launch area would contain two road-served launch pads, a buried control bunker, and a building comparable to the Possible Missile Ready Building at Complex "C". The launch area will be secured, and the road pattern will be similar to the heart-shaped pattern at Launch Area "C". If deployed sites follow the pattern evidenced at Tyura Tam, they will be readily recognizable on good-quality KEYHOLE photography, even if it is of small scale.

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A comparison between the Soviet ICBM program and other Soviet missile programs tends to support the conclusion that deployed ICBM sites will closely resemble an operational prototype site. General terrain features may demand a slight variation to this design. Examination of photography of facilities for two SAM systems and at least two SSM ballistic missile systems has revealed an unmistakable pattern in the development of each system. In every case, a pure R&D launching facility was first constructed to develop the missile. The Soviets then constructed a

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prototype operational launching facility, which was also used for training troops. The configuration of deployed sites closely resembled the configuration of the prototype site at the test range.

The most extensive implementation of this concept evidenced on photography has been in the SAM systems. Examination of [REDACTED] 25X1D photography of the SAM Facilities at the Kapustin Yar/Vladimirovka Missile Test Center disclosed an R&D launching facility designed to develop both the SA-1 and SA-2 missile systems. Immediately adjacent to this R&D facility, a complete 60-launcher herringbone launch site was constructed, and immediately south of the herringbone site a complete prototype SA-2 launch site was constructed. Both the SA-1 and SA-2 deployed sites are almost exact replicas of the prototype sites at Kapustin Yar. While variations in site configuration, often dictated by terrain irregularities, are evident, even the small SA-2 launch sites are readily identifiable on KEYHOLE photography.

Within the SSM facilities developed at Kapustin Yar, a similar development is in evidence. Photography of Launch Complex "C" at Kapustin Yar reveals that R&D of a 700-mile missile system were effected at Launch Site 3-C, followed by the construction of a prototype and training launch site immediately adjacent to the R&D launch pad. Later photography of the Chelkar area revealed a field launch site almost identical in size and arrangement of revetments to the prototype site at Kapustin Yar.

25X1D A smaller ballistic missile system, probably the 300-nautical-mile missile system, was probably developed at Launch Complex "A" at Kapustin Yar. [REDACTED] photography of Kapustin Yar revealed a complete prototype missile site configuration for the same missile system at Launch Complex "G".

Such a development system as outlined above is necessary, not only to evolve workable deployment concepts and suitable ground support equipment, but also to provide a training environment as close as possible to the ultimate deployed-site environment. It is probable that, in almost

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any missile system involving extensive R&D of the missile itself, the facilities necessary would not be found at an operational site, and their presence would hamper the training of personnel. Conversely, the requirement for training a relatively large number of personnel before deployment would unquestionably hamper further R&D projects if such training were given at an R&D facility. In the case of Tyura Tam, it would be extremely difficult to attempt to train personnel at R&D facilities while still utilizing those same facilities for space research, as well as the development of improved ICBM systems, if such development is under way.

It is therefore probable that Launch Complex "C" at Tyura Tam was constructed to provide just such a training environment, unhampered by R&D activities, and it can be further concluded that ICBM sites modeled closely on the concepts evidenced at Complex "C" will probably be identified in field deployment.

SAM DEFENSES

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A significant new development at the Tyura Tam Missile Test Center is the construction of a SAM defense system. Six hexadic SA-2 sites and a SAM support facility have been added to the Range Head since [REDACTED]

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SAM Sites

The six SAM sites are arranged in an oval around the Range Head (see Figure 1 for their locations). All are in an intermediate phase of construction, with the launch and guidance revetments apparently complete but no road pattern yet discernible.

The sites are nearly equally spaced, no less than 14 miles and no more than 18 miles apart. The long axis of the defense pattern measures

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39 miles, and the short axis measures approximately 22 miles. The sites are located at the following coordinates:

46-04-50N 063-14-10E
 46-09-50N 063-36-40E
 46-00-20N 063-55-30E
 45-49-00N 063-44-20E
 45-43-00N 063-19-40E
 45-52-00N 063-01-40E

While the sites appear to be nearly equidistant from existing facilities, the probable expansion of the Range Head evidenced by the new roadbed under construction east of Launch Complex "C" suggests that additional sites may be constructed farther to the east to provide adequate protection at some future time, and that at least one site (the third listed above) may be relocated when such new construction is initiated.

SAM Support Facility

A SAM Support Facility (see Figure 6) is under construction near the center of the oval pattern of SAM sites, at 43-53-30N 063-26-00E. The facility is similar in size, road layout, and number and type of buildings to other SAM support facilities found elsewhere in the USSR and [REDACTED]

[REDACTED] One feature found at the Tyura Tam site which is not evident at other sites is the presence of five barracks-type buildings immediately adjacent to the Support Facility. However, most other SAM support facilities have been constructed at or near existing antiaircraft artillery barracks or other military installations. Since no such facility exists at the Test Center, it is probable that this group of buildings is used to house personnel associated with the SAM defense system.

The SAM Support Facility is enclosed by a single fence, measuring about 1,500 by 600 feet. The interior road net skirts the inside of the fence, and at least nine buildings, including one revetted bunker, are vi-

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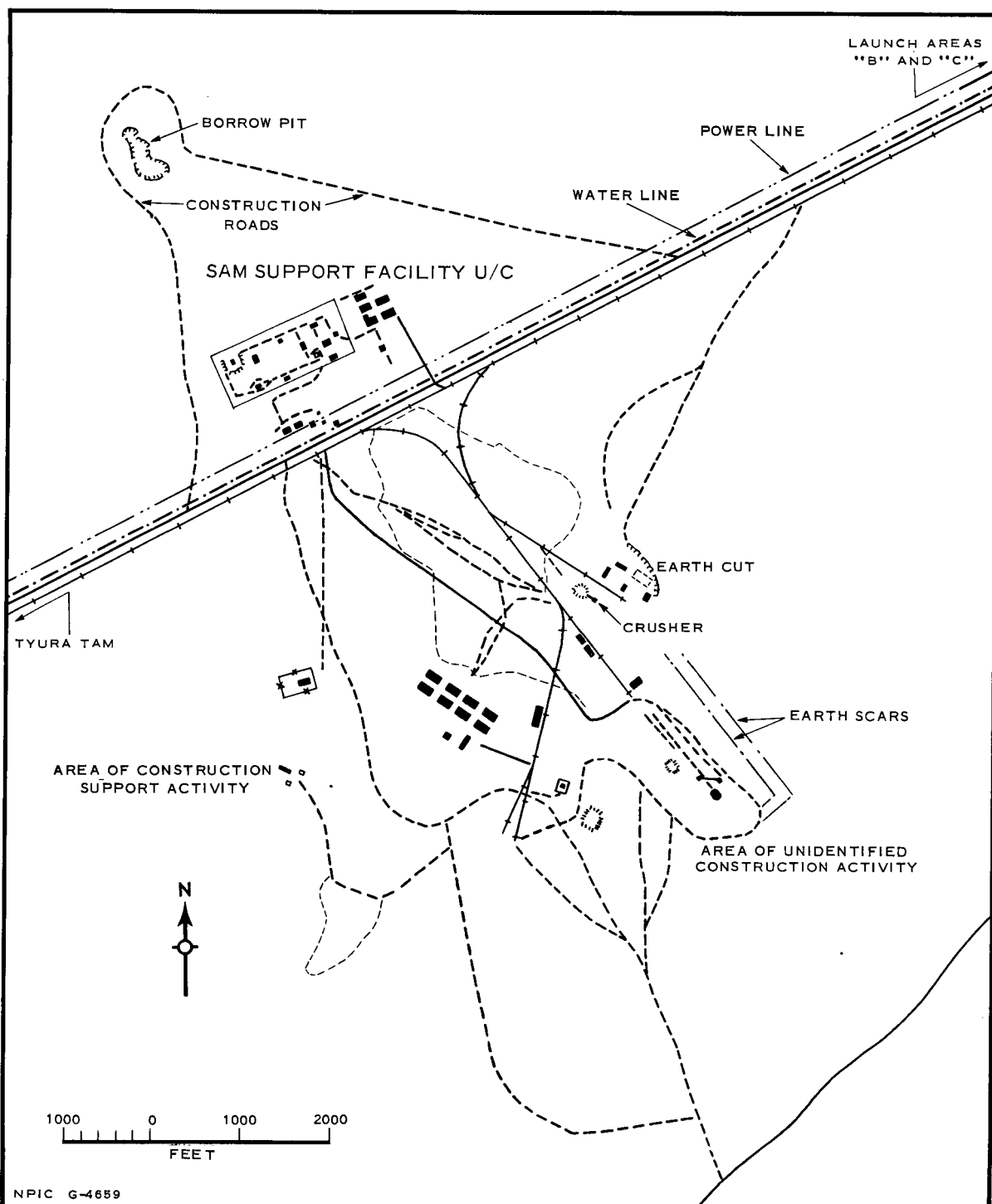


FIGURE 6. CENTRAL SUPPORT FACILITY. A SAM Support Facility and an Area of Unidentified Construction Activity were the major additions to this facility between [REDACTED]

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sible. The assembly and checkout building, measuring about 190 by 90 feet, is incomplete. Only the two ends have been roofed, and the main assembly bay is still open. The status of construction of the other buildings inside the fence cannot be determined.

The five barracks-type buildings are about 500 feet east of the support facility. Four of them measure about 120 by 60 feet, and are probably barracks. The fifth, a probable administration building, is L-shaped, measuring about 100 by 50 feet, with a 60- by 40-foot wing on the west end.

An unidentified facility, which may be associated with the SAM Support Facility, is located to the south, adjacent to the power line which serves Launch Complexes "B" and "C". This facility consists of three or four probable buildings. A faint track connects it to the SAM Support Facility.

GUIDANCE AND INSTRUMENTATION FACILITIES

Because of the small scale of the KEYHOLE photography, it is generally impossible to identify the normally smaller facilities associated with guidance and instrumentation. Accordingly, few changes in guidance and instrumentation facilities can be discerned from Mission [REDACTED] Construction of new instrumentation facilities has been insignificant. One new site has been added near Launch Complex "A" (and is described under that heading). No identifiable instrumentation sites have been found near Launch Complexes "B" or "C".

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INSTRUMENTATION CONTROL CENTER

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This facility (see Figure 3) appears unchanged since [REDACTED] The only addition visible in its immediate vicinity is a single building, measuring 50 by 30 feet, which has been added in the northeast corner of the vehicle park.

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INTERFEROMETER

The interferometer adjacent to the Instrumentation Control Center appears unchanged.

DOWN-RANGE INSTRUMENTATION

No significant changes have been made at the down-range instrumentation stations. Of the two major stations, Sites 28 and 29/30, only Site 28 was covered by photography [REDACTED] Within that station six new buildings have been added. When the site was photographed in [REDACTED] a landing area had been prepared on a dry lake bed just east of the site. That area has now been abandoned, and a new graded landing area measuring 700 by 90 feet has been prepared 1,300 feet northeast of the site.

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POSSIBLE ELECTRONICS FACILITY

The possible electronics facility north of Launch Complex "C" is described in detail under that heading.

SUPPORT BASE

Most of the Support facilities have undergone few changes since they were last covered by photography. For reporting purposes, a number of facilities have been regrouped by functional categories, and will be listed in the discussion that follows, even though no discernible changes may have taken place. Generally, however, the discussion of the Support Base follows the organization used in PIC/JR-2/60. 2/

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Support facilities have been grouped into three general categories, regardless of their geographic locations in the Test Center: Operational Support Facilities, Logistical Support Facilities (including a Central Support Facility, formerly included in the discussion of the Range Head), and Administrative Support Facilities. In some cases the function of a particular facility may extend into several categories; in those cases, the facility is included under its primary functional category.

OPERATIONAL SUPPORT FACILITIES

These facilities consist of the Communications Facilities and the Propellant Production and Storage Area. No significant changes have been noted at any of the three Communications Areas. There is no discernible change at the Propellant Production and Storage Area.

LOGISTICAL SUPPORT FACILITIES

These facilities include the Central Support Facility; the Storage and Construction Support Area; the Water Treatment, Storage, and Distribution Facilities; the Transportation Facilities; and the Power Production and Distribution Facilities. Only in the Central Support Facility and the Transportation Facilities have there been any significant changes. These are discussed below.

CENTRAL SUPPORT FACILITY

The Central Support Facility, previously designated the Construction Support Area, has expanded twofold since the [REDACTED] photography. While it has apparently continued to be a prime source of construction

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material for the construction of Launch Complexes "B" and "C", it has also expanded in function. Significant changes to the area since [REDACTED] are (1) addition of a SAM Support Facility (discussed above under SAM Defenses) under construction north of the east-west rail line serving Launch Complexes "B" and "C"; (2) new facilities in the area of construction support activity; and (3) an area of unidentified construction activity approximately one mile south of the rail line (see Figure 6).

Area of Construction Support Activity. The expansion of the construction support facilities noted since [REDACTED] appears to be commensurate with the expansion of range facilities during that period. New facilities (shown in green on Figure 6) include two new rail spurs. One of these has been added to the original rail spur near its north end to form a wye (which, incidentally, provides the only point north of Tyura Tam village where rolling stock can be turned around). The second spur branches off the original spur to the southwest, for a distance of 2,500 feet. A third, shorter, spur, 850 feet long, branches off the second spur near its midpoint. This spur may serve as a storage spur for construction material.

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Some 15 miscellaneous buildings have been added within the area of construction support activity. Eight of these, each about 120 by 50 feet, are arranged in two parallel rows and may serve as temporary housing for construction personnel or may provide storage space. The other buildings, one of which is enclosed by a fence and is isolated from the rest, are scattered at random throughout the area. Access to most of the new buildings is by a new access road; the fenced site containing one building is reached by a separate road running due south from the main road which serves the launch complexes.

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The crusher plant, which appeared active on [REDACTED] photography, is probably still in operation. Both the crusher and the pile of aggregate near it remain in the same position as they were in [REDACTED]. One small construction support building has been added east of the crusher.

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Area of Unidentified Construction Activity. Probably the most significant addition to the Central Support Facility since [REDACTED] has been the activation of a new construction project south of the construction support facilities. The focal point of this new construction is a shallow excavation which has been prepared at the site of a rock outcrop which was visible on [REDACTED] photography. The excavation is square, measuring approximately 200 feet on a side. Near its center is a darkened, irregular area, approximately 120 feet in diameter. In the center of this darkened area are two mounded objects, whose outlines are indistinct, each measuring about 50 by 20-25 feet and placed at right angles to each other to form an "L". Earth spoil from the excavation has been piled on three sides; the fourth side, to the northwest, has been left open to permit access by construction vehicles. Two possible buildings, on the southeast and southwest sides of the excavation, may serve as construction sheds. Approximately 200 feet northwest of the excavation are two structures, whose shape is indistinct, positioned on either side of the access road. A possible overhead conduit or conveyer extends between the two structures.

Extensive scarring throughout the area between the excavation and the end of the original rail spur line suggests the use of a considerable amount of construction equipment. Two parallel earth scars, 150 feet apart, extend from a point 800 feet east of the excavation in a northwesterly direction for a distance of about 2,100 feet. Two additional scars intersect the southeast end of the parallel scars and extend southwest for a distance of about 400 feet. These scars may indicate security fences. However, scars from other security fences identified on Mission [REDACTED] photography of Tyura Tam, even those recently constructed, do not resemble these scars in any way. Furthermore, both the long parallel scars appear to terminate at the same point at their northwest end, which would not be the case if that end represented the corner of a double security fence. It is therefore considered equally possible that the scars may represent open ditching.

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A road, newly constructed since [REDACTED] provides access from the main road serving the launch complexes to the area of unidentified construction activity. It extends southeast a distance of 3,500 feet, part of it crossing a dry lake bed, and then bends sharply northeast around the end of the lake bed and continues an additional 600 feet before terminating near the end of the original rail spur. At this point, a building, measuring approximately 120 by 60 feet, has been constructed. If the parallel earth scars do represent fences, this building might then serve as a security building. If so, however, there is no apparent explanation for the road alignment to that point.

The function of the area of unidentified construction activity cannot be determined, since construction within the area has not progressed to the point where positive identification of any of the facilities can be made. The most probable function of the area, based on its central location within the range head, is a support function of an undetermined nature. If the construction in progress within the excavation is to be enclosed by security fencing, it is probable that it will be of a sensitive nature. However, the expansion of the older permanent construction support activities, to support both the new construction of launch facilities and the construction of the unidentified facility itself, would not be consistent with the addition of a sensitive facility. Furthermore, the presence one mile away of the SAM Support Facility, not associated with any of the operational aspects of the Missile Test Center, suggests that the area of unidentified construction may not be of particular significance.

In the examination of this area, several possible functions have been considered. They are assessed below.

1. Possible launch facility under construction. The mere fact that this facility is located at a missile test center requires that some consideration be given to the possibility that it may be a launch facility under construction. However, there is no tangible evidence to support such a hypothesis, whereas there are many indications that the area is probably not suitable for such a function. The location is probably not suitable for

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the construction of an additional launch facility, since missiles fired on the known test range azimuth (40 degrees) would pass over a point midway between Launch Complexes "B" and "C", which lie 8 and 10 miles away, respectively. Four craters, indicative of missile malfunctions, were found on the [REDACTED] photography, varying in distance from 3.5 to 4.5 miles northeast of Launch Complex "A" and in azimuth from [REDACTED] degrees from the launch point. Unless a high degree of confidence in test vehicles has now been obtained, it is not likely that the Soviets would jeopardize their other launch facilities by placing a new launch facility at the Central Support Facility. On the basis of present evidence, there is no reason to suspect that the Soviets intend to use a new test range. The optimum direction of fire, to achieve maximum instrumented range for ICBM test vehicles, is toward the Kamchatka Peninsula. Test firings in other directions would either terminate in the Arctic, where instrumentation would be extremely difficult, or would pass over international boundaries. It is therefore considered improbable that the facility is suitably located for the firing of ICBM vehicles. The same geographic restrictions would not apply, however, to the orbiting of satellites. It is probable, however, that Launch Complexes "A" and "B" provide adequate facilities for that purpose.

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The relationship of the unidentified construction activity to surrounding facilities further decreases the likelihood that a new launch facility is being constructed here. The presence of the SAM Support Facility, as well as the area of construction support activity, both in the immediate vicinity of the new construction activity, are not indicative of the activation of a new, extremely sensitive project.

The lack of features normally associated with missile launch facilities further tends to indicate that this unidentified construction is not a launch facility under construction. Regardless of the type of missile that might be tested here, it is probable that at least one large building for handling and checkout would also be under construction concurrently with the construction of the launching structure itself.

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2. Storage facility under construction. The central location of the unidentified construction activity with respect to the launch complexes suggests that the facility may serve a support function for all three existing launch complexes and may serve as a storage point for liquids which could be stored in bulk and readily accessible.

3. Interim handling facility. The facility could also serve as an interim handling facility for some component which it was necessary to handle at some distance from the launch facility. In this case, however, the distance from the launch facilities seems excessive, and if distance from launch facilities were a requirement, it would, again, be unlikely that the SAM Support Facility would be located nearby.

TRANSPORTATION FACILITIES

These facilities include Tyura Tam Airfield and the Tyura Tam Rail Facilities. No significant changes in the rail facilities are discernible. Changes at the airfield are described below.

The only significant change noted at Tyura Tam Airfield is the addition of a possible POL storage facility about 750 feet southwest of the west end of the apron. This facility consists of a row of six low structures, possibly storage tanks, each approximately 60 feet in diameter. A low wall or fence, measuring about 600 by 300 feet, encloses the area. Five new buildings, approximately 75 feet square and evenly spaced in a straight line, are located northeast of the parking apron. Five possible aircraft are discernible on the parking apron.

ADMINISTRATIVE SUPPORT FACILITIES

These facilities include the Administration and Housing Area and Tyura Tam Village and Associated Facilities. No changes in the latter are apparent.

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The Administration and Housing Area has been expanded to the east. Part of this expansion is in the area which was not visible on the previous photography of the Support Base because of the photographic "holiday". A total of 11 new buildings have been added, increasing the total floor space of structures in the area from 1,608,000 to almost 1,780,000 square feet.

Seven identical new housing structures, west of the Administration and Housing Area, but probably serving the same function, have been added to the group of 12 buildings outside the southeast corner of the fence surrounding Communications Area "B".

SUMMARY OF CONSTRUCTION PROGRAM AT TYURA TAM

25X1D The [REDACTED] mission was the [REDACTED] photographic mission over the Tyura Tam Missile Test Center. The time interval between missions has provided many indicators of construction time required for the operational complexes at the Test Center. Consultation with construction experts associated with US missile programs and information from collateral sources have tended to corroborate the estimates of construction time presented below and illustrated in Figure 7.

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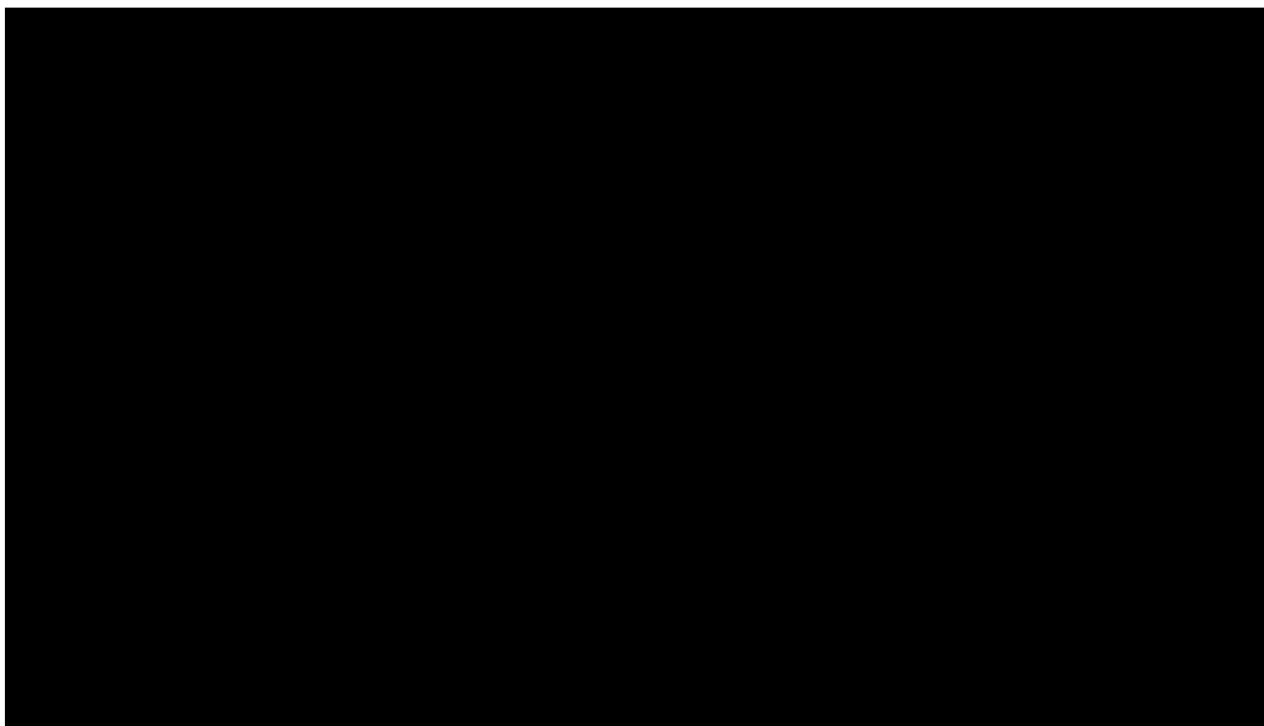
25X1D The first photographic coverage of the Test Center was from TALENT Mission [REDACTED]. Although the photography of Launch Complex "A" was not usable because of extreme obliquity and haze, the photography of the Support Base provided an indication that the Center had only recently become operational: only two of the antennas within Communications Area "B" had been erected.

25X1D TALENT Mission [REDACTED] revealed that 12 more
25X1D antennas had been erected within Communications Area "B" during the [REDACTED] days between missions. Photography on that mission of Launch Complex "A" indicated that, while the Complex was complete, the extent of activity suggested that it had only recently achieved operational status.

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On 4 October 1957, Sputnik I was launched. Unless political and propaganda considerations far outweighed normal research and development procedures, it would be reasonable to assume that several actual launchings, as well as a number of captive engine tests, had been conducted before that time. Accordingly, it is probable that Launch Complex "A" was operational; that is, capable of static engine tests as well as actual missile or booster firings, before the [REDACTED] photography, and probably as early as [REDACTED]. A crater some 60 feet in diameter, located about 4 miles from the launching structure on [REDACTED] photography, indicates that at least one missile had been launched from Launch Complex "A" before [REDACTED].

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25X1D

Discussions with personnel concerned with US ICBM site construction indicate that the type of construction at Launch Complex "A" would take approximately 24 months.

Launch Complex "B", essentially of the same type of construction as Launch Complex "A", and requiring almost the same amount of prepara-

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tion of rail and road access in addition to construction of the launch area itself, would also take nearly 24 months from activation to operational status. The construction at Launch Complex "B" at the time of the [REDACTED] photography (Mission [REDACTED]) was estimated to be about 50 percent completed. Major excavations had been finished, but most of the heavy concrete work, as well as extensive cabling and plumbing work, was yet to be done. If the estimated construction time of 24 months is valid, site activation at Launch Complex "B" would have been about [REDACTED] and the complex would not have become operational until late spring or early summer [REDACTED]

Launch Site 2-A could have taken as little as 12 months, possibly less, to construct. Inasmuch as KEYHOLE Mission [REDACTED] provided the first coverage of Launch Complex "A" since [REDACTED] Launch Site 1-A could have been started any time within an [REDACTED] month period. If it had been started in the late summer or early fall of 1959, it could have been operational by the fall of 1960.

Launch Complex "C", first covered by TALENT Mission [REDACTED] is considerably simpler than either Launch Site 1-A or Launch Complex "B" and requires far less excavation, heavy concrete work, and electrical and plumbing connections. On this [REDACTED] photography, the launch complex was about 25 percent completed; the [REDACTED] photography of Launch Complex "C" shows the complex to be 90-95 percent completed, as evidenced by the presence of an incomplete drive-through building in the Support Area, a difference in surface toning between Launch Sites 1-C and 2-C, the presence of construction spurs within the launch support areas, and the fresh ground scarring in evidence around many of the structures. US construction experts estimate that a prototype "soft" ICBM launch site such as is found at Launch Complex "C" would require 18-24 months between site activation and completion; and that operational sites patterned on Launch Complex "C", taking advantage of experience in construction, would require about 18 months. It would therefore be reasonable to infer that construction of Launch Complex "C"

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began about December 1959 and that it would not have become operational until about March or April 1961.

Construction of actual ICBM operational sites, assuming that some degree of concurrency is desired, could have begun at any time in 1960. If the construction program was not proceeding on a "crash" basis, and some lead time in overcoming unforeseen difficulties was desirable, the construction of operational sites may have followed construction of Launch Complex "C" by some 6 months; on that basis, the Soviets could have some missiles on launchers at deployed sites modeled on Launch Complex "C" by mid 1961.

CONCLUSIONS

1. Launch Complex "C", probably operational early in 1961, has been designed as a prototype operational ICBM launch site, with the dual capability of testing operational concepts for use in deployed sites and of training troops. Launch Site 2-A, which was probably operational late in 1960, may have been constructed to test the missile-handling concepts and ground support equipment to be used at Launch Complex "C", while requiring a minimum of new construction through the use of existing facilities at Launch Site 1-A. It is also possible that Launch Site 2-A represents a separate prototype site configuration.

2. Launch Site 1-A and Launch Complex "B" probably serve nearly identical purposes. Both can be utilized in research and development on ICBM test vehicles and in space missions. Launch Complex "B" was probably operational by mid-1960, although construction activity is continuing at the Complex.

3. Deployed ICBM launch sites will probably be operational some time in 1961, depending on the initiation of construction and the availability of trained personnel. Construction time for these sites will be approximately 18 months, and they will probably closely resemble Launch

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Complex "C", although any given launch complex will have an undetermined number of launch areas with each support area. Such deployed sites will probably be recognizable on good-quality KEYHOLE photography.

4. The probable function of the unidentified construction activity in the southern portion of the Central Support Facility cannot be determined at its present stage of construction. It will probably serve a support function which will fill a common requirement of existing launch complexes. It will probably not be a launch facility.

5. The presence of SAM defenses at the Missile Test Center indicates a growing Soviet concern with the sensitive test activity in progress. Tyura Tam is now an operational missile launch facility capable of delivering missiles against the US. It is possible that future ICBM sites, deployed elsewhere in the USSR, will be similarly defended. Such SAM defenses will be a further indicator of operational ICBM sites on KEYHOLE photography.

6. The construction of a new roadbed extending east of Launch Complex "C" indicates that expansion of the Missile Test Center is continuing and that the construction of a possible additional launch complex may be contemplated.

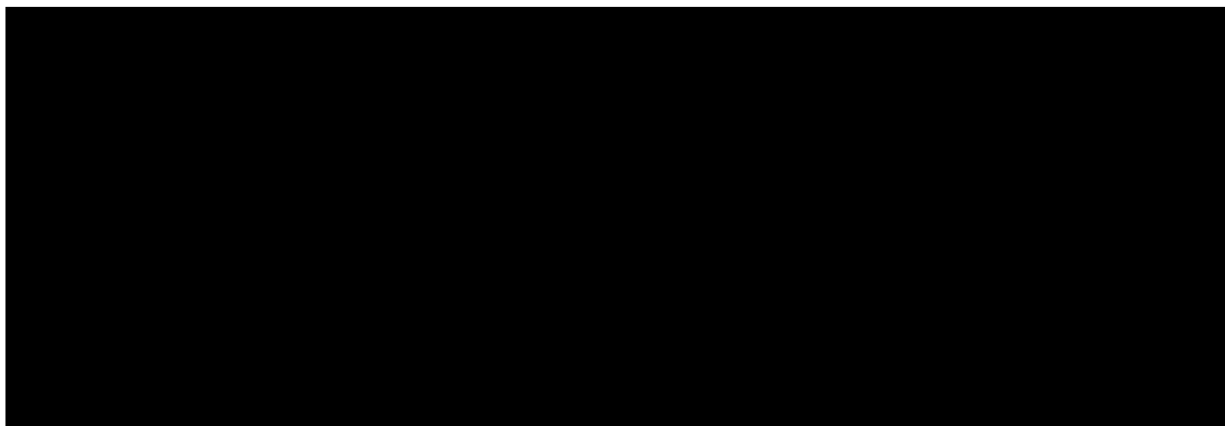
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